CLAIMS

What Is Claimed Is:

Claim 1. A banknote condition detection device for a banknote storing unit, comprising:

a banknote storing unit for being removably positioned within a banknote receiving unit, the banknote storing unit receives a banknote from the banknote receiving unit, the received banknote being moved by a moving unit within the banknote storing unit for storing the received banknote within the storing unit;

a plurality of optical guide units having a projecting surface and a receiving surface, a portion of each optical guide unit being positioned at a surface of the storing unit; and

a plurality of optical emitter-receiver pair units disposed within the banknote receiving unit and operatively associated with the plurality of optical guide units, each optical emitter-receiver pair unit being disposed to send light to and receive light from a predetermined optical guide unit.

Claim 2. The banknote condition detection device of Claim 1, each optical guide unit further comprising:

a detecting projecting surface disposed adjacent to a receiver section of a corresponding optical emitter-receiver pair unit for sending light to the receiver section of the emitter-receiver pair unit; and

a detecting receiving surface disposed adjacent to an emitter section of the corresponding optical emitter-receiver pair unit for receiving light from the emitter section of the emitter-receiver pair unit.

Claim 3. The banknote condition detection device of Claim 1,

wherein a predetermined optical guide unit and a predetermined optical emitter-receiver pair unit comprise a position detecting unit including a position detecting optical guide unit and a position detecting emitter-receiver pair unit, the position detecting unit further comprising:

a detecting projecting surface on the position detecting optical guide unit for emitting a light beam received from an emitter section of the position detecting emitter-receiver pair unit; and

a reflector member for reflecting the light beam from the detecting projecting surface member, the reflector member being disposed adjacent to a banknote moving passageway opposite from the position detecting optical guide unit.

Claim 4. The banknote condition detection device of Claim 2,

wherein a predetermined optical guide unit and a predetermined optical emitter-receiver pair unit comprise a standby detecting unit including a standby detecting optical guide unit and a standby detecting emitter-receiver pair unit, the standby detecting optical guide unit further comprising:

a detecting projecting surface; and

a detecting receiving surface for facing the detecting projecting surface in the standby position of the storing unit.

Claim 5. The banknote condition detection device of Claim 2,

wherein a predetermined optical guide unit and a predetermined optical emitter-receiver pair unit comprise a moving position detecting unit including a moving position optical guide unit and a moving position emitter-receiver pair unit, the moving position optical guide unit further comprising:

a detecting projecting surface; and

a detecting receiving surface for facing the detecting projecting surface in the moved position of the storing unit.

Claim 6. The banknote condition detection device of Claim 2,

wherein a predetermined optical guide unit and a predetermined optical emitter-receiver pair unit comprise a storing amount detecting unit including a storing amount optical guide unit and a storing amount emitter-receiver pair unit, the storing amount optical guide unit further comprising:

a detecting projecting surface; and

a detecting receiving surface for facing the detecting projecting surface in the full amount position of the stored banknotes in the storing unit.

Claim 7. The banknote condition detection device of Claim 1,

wherein the plurality of optical guide units include an optical resin.

Claim 8. The banknote condition detection device of Claim 7,

wherein the optical resin is an acrylate resin.

Claim 9. The banknote condition detection device of Claim 2,

wherein the optical guide unit includes a first column and a second column, a first end of the first column includes a first reflecting surface, a first end of the second column includes a second reflecting surface, the first reflecting surface facing the second reflecting surface,

wherein a side surface of the first column includes the detecting projecting section while a side surface of the second column includes the detecting receiving section,

wherein the optical guide unit includes a receiving surface on the second end of the first column on the end of the first column opposite to the reflecting surface of the first column, the optical guide unit includes a projecting surface on the second end of the second column on the end of the second column opposite to the reflecting surface of the second column.

Claim 10. The banknote condition detection device of Claim 1,

wherein for each of the guiding units the receiving surface and the projecting surface is flush with the surface of the storing unit.

Claim 11. The banknote condition detection device of Claim 1, each optical emitter-receiver pair unit further comprising:

wherein the emitter section of the emitter-receiver pair further comprises:

a light emitting element for emitting light;

a first cylinder having a first end and a second end, the first end of the first cylinder for retaining the light emitting element so that the light emitting element projects light into the first cylinder from the first end to the second end, and

wherein the receiver section of the emitter-receiver pair further comprises:

a light detecting element for detecting light;

a second cylinder having a first end and a second end, the first end of the second cylinder for retaining the light detecting element so that the light detecting element detects a portion of light admitted into the second cylinder from the second end to the first end.

Claim 12. The banknote condition detection device of Claim 11,

wherein the second end of the first column is disposed adjacent to the receiving surface of the corresponding optical guide unit, and

wherein the second end of the second column is disposed adjacent to the projecting surface of the corresponding optical guide unit.

Claim 13. An optical detecting system for optically detecting conditions within a banknote storing unit inserted into a banknote receiving unit, comprising:

a banknote receiving unit having a plurality of optical emitter-receiver pair units for emitting and receiving light; and

a banknote storing unit for being removably positioned within the banknote receiving unit, the banknote storing unit having a plurality of optical guide units for receiving, reflecting, and projecting light from the plurality of optical emitter-receiver pair units, the plurality of emitter-receiver pair units being aligned with the plurality of optical guiding units when the banknote storing unit is positioned within the banknote receiving unit, the presence or absence of light being reflected from a predetermined optical guide unit indicating a predetermined condition.

Claim 14. A optical detecting system for optically detecting conditions within an enclosed unit inserted into receiving unit, comprising:

a receiving unit having a plurality of optical emitter-receiver pair units for emitting and receiving light; and

an enclosed unit for being removably inserted into the receiving unit, the enclosed unit having a plurality of optical guide units for receiving, reflecting, and projecting light from the plurality of optical emitter-receiver pair units, the plurality of emitter-receiver pair units being aligned with the plurality of optical guiding units when the enclosed unit is inserted within the receiving unit, the presence or absence of light being reflected from a predetermined optical guide unit indicating a predetermined condition.

Claim 15. A banknote condition detection device for a banknote storing unit, comprising:

a banknote receiving unit for receiving a banknote;

a banknote storing unit for being removably positioned within the banknote receiving unit, the banknote storing unit receiving a banknote from the banknote receiving unit, the received banknote being moved by a moving unit within the banknote storing unit for storing the received banknote within the storing unit;

a plurality of optical guide units having a receiving surface, a portion of each optical guide unit being positioned at a surface of the storing unit,

a plurality of optical emitter-receiver pair units disposed within the banknote receiving unit opposite the plurality of optical guide units, each optical emitter-receiver pair unit being disposed to send light to and receive light from a predetermined optical guide unit.

Claim 16. A banknote condition detection device for a banknote storing unit, comprising:

a banknote receiving unit for receiving a banknote;

a banknote storing unit for being removably positioned within the banknote receiving unit, the banknote storing unit receiving a banknote from the banknote receiving unit, the received banknote being moved by a moving unit including a pusher member within the banknote storing unit for storing the received banknote within a storing section of the storing unit;

a storing unit position detecting unit for detecting the position of the storing unit within the banknote receiving unit;

a banknote position detecting unit for detecting a banknote positioned at a banknote moving passageway within the banknote storing unit;

a standby position detecting unit for detecting the standby position of the pusher member;

a pushed position detecting unit for detecting the active position of the pusher member; and

a storing amount detecting unit for detecting the full condition of the banknote storing section.

Claim 17. A optical detecting method for optically detecting conditions within an enclosed unit inserted into receiving unit, comprising:

transmitting a beam of light from a receiving unit towards an enclosed unit to produce a transmitted beam of light;

receiving the transmitted beam of light within the enclosed unit to produce a received beam of light;

reflecting the received light beam to produce a reflected beam of light;

projecting the reflected light beam out of the enclosed unit towards the receiving unit to produce a projected beam of light; and

detecting the projected beam of light to indicate a predetermined condition.

Claim 18. The optical detecting method of Claim 17,

wherein detecting the projected beam of light indicates a true condition.

Claim 19. The optical detecting method of Claim 17, further comprising:

interrupting one of the transmitted beam of light and the projected beam of light to indicate the condition that an object is disposed between the enclosed unit and the receiving unit.

Claim 20. The optical detecting method of Claim 17, further comprising:

interrupting the reflected light beam of light to indicate the condition that an object is disposed at a predetermined position within the enclosed unit.

Claim 21. A storing unit for receiving banknotes, comprising:

a passageway for transporting banknotes; and

an optical guide assembly for receiving and transmitting light signals indicative of the passage of a banknote along the passageway.